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THE PLANT DISEASE REPORTER

Issued by

THE PLANT DISEASE SURVEY

DIVISION OF MYCOLOGY AND DISEASE SURVEY

Vol. XVIII April 1, 1934. Number 3

FURTHER NOTES ON CROP FAILURES DUE TO DISEASES

ILLINOIS: H. W. Anderson, March 26, 1934.

The most outstanding case in this as well as neighboring States is the watermelon wilt (Fusarium niveum). This is especially significant since practically no other crop can be grown on the land where water melons are grown on account of its sandy nature. I know of four very important watermelon areas in different parts of the State where the industry has passed out of the picture. It is true that this land was originally cheap, but the farmer who had established his home on such a farm has had a hard time since the wilt has become established and many of these farms have been abandoned.

A number of years ago, rhubarb was grown in southern Illinois for the early trade in Chicago. Many of the growers had to abandon this business because of the prevalence of Phytophthora crown rot. While control was possible, they preferred to give up the industry rather than attempt control.

A commercial horse radish area was started near Quincy, Illinois, several years ago and was abandoned because of a disease the cause of which we have not yet determined. This disease is also present in the largest commercial horse radish area in the world, near East St. Louis. It is not wide-spread in this region at present.

Several years ago a fruit grower attempted to grow filberts in this State. Within six years, practically all of those were killed out by the filbert blight (Cryptosporella anomala).

We are often met with the statement that "such and such a crop" was grown extensively in this region at one time, but was abandoned because the yields fell off to such a point that the crop was no longer profitable. In practically all cases, the growers stated that the trouble was not due to lack of fertility because other crops yielded well on such land. I am convinced that the disease factor was the real reason.

OBSERVATIONS ON DISEASES OF GRAMINEAE IN OREGON AND ADJACENT PARTS OF WASHINGTON DURING THE OPEN WINTER OF 1933-1934.

Roderick Sprague

The unparalled period of moist spring-like weather during all winter in Oregon resulted in a tremendous epiphytotic of cereal and grass diseases. Some of those new or of interest are as follows:

Pseudodiscosia sp. on winter turf oats (Avena sativa) forms pale, red-bordered or indefinite lesions on the leaves during February and March. The diagnosis is purely tentative as there is apparently no disease of Gramineae caused by a similar fungus. From Klickitat County, Washington.

Septoria tritici Desm. on winter spelt (Triticum spelta). This leaf spot was found for the first time on this host in experimental plots in the Alsea Valley, Oregon, in early March. Spelt was entirely free from this disease during 1930 to 1933 although the physiologic form of S. tritici on oats has always been prevalent in adjacent plot rows. The form on spelt resembles that on oats but exact classification awaits cross-inoculation experiments.

Septoria tritici Desm. on wild oats (Avena fatua). This host was heavily infested throughout western Oregon. Winter oats was also severely infested not only in the usual Coast Region but in the Willamette Valley as well where it usually is of slight importance.

The so-called Gibellina foot rot of cereals which is caused by a fungus identical to a culture labelled Gibellina cerealis Pass. sent from Italy appeared this season in the coast region in January although in previous years it was first seen in May. It appeared on volunteer oats and on last year's second growth oats from stubble which did not die during the winter. It caused lesions not only on the stems but on the leaves lying next to the soil and even on leaf bases ten or more inches above the ground. It attacked in commercial fields and in experimental plots wheat, oats, spelt, and Notholcus lanatus, and a similar condition was noted on Festuca myuros.

Mastigosporium album Ries. var muticum Sacc. produces dark grey, red-bordered lesions on vigorous leaves of orchard grass (Dactylis glomerata). It is associated in many cases with the more common Scolecotrichum graminis Fckl. but is widespread and in the coast region is more common than the Scolecotrichum leaf spot.

Fusoma sp. on Lolium multiflorum. This disease was very destructive in midwinter, involving almost all of the leaves of this grass near Corvallis. The disease was characterized by many small brown lesions on each leaf. The fungus resembles F. triseptata Sacc.

Ovularia sp. on Festuca myuros. Produces sunken light brown lesions which involve the entire diameter of the slender leaves of this grass. The disease is widespread in western Oregon. It is usually difficult to find good sporulating material.

Septoria agropyri Ell. and Ev. On Agropyron tenerum along the Columbia River in Wasco County; very common. On A. spicatum near Goldendale, Washington.

Septoria sp. on Lolium perenne near Corvallis, Oregon. This disease occurs with Diplodina (Ascochyta) lolii Died, Leptosphaeria sp., and Phytophthora sp. on the leaves of this grass.

Cereal rusts which included Puccinia graminis avenae, P. coronata and rusts on various grasses started very early in December but were held in check to some extent by an active attack of Darluca filum Cast. This probably saved the Poa grasses from almost complete destruction in early January.

Cercosporella foot rot. On February 15, winter wheat was as heavily infested with C. herpotrichoides as is usually the case six weeks later. From the depth of the lesions infection must have started in very early winter, a condition which is the usual thing near Paris, France, but is very exceptional for the Pacific Northwest.

ENGLISH FORM OF TOMATO SPOTTED WILT FOUND IN OREGON GREENHOUSE

Frank P. McWhorter, Plant Pathologist,
Oregon State College

We recently received tomato plants brought in from a greenhouse in North Bend, Oregon, which was diseased with a malady entirely new to the grower. He was an experienced grower, familiar with the ordinary forms of greenhouse tomato troubles, such as streak, mosaic, etc., and therefore duly alarmed at the appearance of a disease which he could not recognize and one which he considered more serious than any he has hitherto encountered. The plants were somewhat wilted when they reached this office, but the leaves showed very striking bronzing symptoms, such as have been reported for spotted wilt. The usual tomato plant habit was deranged by malformations brought about by the in-rolling of leaves, shortening of nodes, and a general stunting. The bronzing and curling or in-rolling of the leaves were very suggestive of the symptoms described for the English form of spotted wilt. The grower informed us that the plants had been grown from seed imported direct from England. The appearance of the plants and this suggestive statement warranted a test for English spotted wilt, using Kenneth Smith's petunia local-lesion method, described in No. 11 of his series entitled, "Studies on Plant Viruses." (The Ann. of Appl. Biol. 19, 305-330. 1932). Two leaves each of five petunia plants were inoculated by the Samuel rubbing method, and likewise two leaves each by the pin-prick method. The rubbed leaves of all five of the inoculates developed local lesions which correspond exactly to those described and pictured by Kenneth Smith. Some of the leaves inoculated by the pin prick method developed similar

symptoms. Dr. Smith considers this a conclusive test for the English form of the spotted wilt virus. The appearance of the tomato plants and the fact that in our trial test 100 per cent of the inoculates developed symptoms considered specific for spotted wilt, leads us to the conclusion that we have the same disease to contend with. The writer has not yet been able to visit the greenhouse and search for a possible local source among associated plants and neighboring weeds, but the available facts suggest strongly the direct transmission of an English disease by English seeds. Smith considers the English form of spotted wilt identical with the Australian form. Geoffrey Samuel in 1930 (Jour, Dept. Agr. Southern Australia 34: 253-272) states that while experimental seed transmission of the disease has not yet been successful in his tests, certain field observations would indicate that seed transmission may occur occasionally and that the possibility of seed transmission should not be entirely excluded.

The greenhouse concerned is not located in a center where field tomatoes are grown, but nevertheless immediate steps will be taken to eradicate the disease from the locality.

[NOTE: Australian spotted wilt has been reported in this country from Wisconsin by Doolittle and Sumner (Phytopath. 21: 106. 1931), and from Michigan by Strong (Mich. Agr. Exp. Sta. Circ. Bul. 139, p. 19. 1932)].

NOTES ON VARIEGATED LEAF TROUBLES OF STRAWBERRIES

George M. Darrow

Because of the interest in the variegated plants of Howard 17, Blakemore and several everbearing sorts, some records made during the past 10 years on the varieties which have been affected, the time that this occurred in relation to their origin or introduction, and their parentage have been tabulated.

Sometime between 1915 when healthy plants were seen and 1920 the foliage of the Columbia strawberry became variegated and the variety soon disappeared from cultivation. Columbia was reported as a cross of Crescent x Sharpless x Parry and was introduced in 1906. In 1920 the foliage of Minnesota (originated 1909, introduced 1918) became variegated. Since then records have been made by the writer on some thirty other sorts, the foliage of which has become variegated and the variety wholly or in part disappeared. The following list gives the year variegation was first observed, the variety or selection, its parentage if known, the year of origin as a seedling, and the year of introduction into the trade.

Year showing yellow foliage	Variety	Parentage	Year of Origin	Year of Introduction
1924	Peerless (everbearer)	Cooper x Autumn	1910	1915
1925	Benson	-	-	1919
	Moneymaker	-	-	1897?
	Kellogg's Prize	-	Found: 1906	1913
	Forward (everbearer)	Autumn x Cooper	1907	1914
	Neverfail (everbearer)	Bubach x Superb	1913	-
1926	USDA Sel. 138	Howard 25 x Klondike	1921	-
	Aldon	President x Marshall	1907	1917
	Mascot	-	-	1908
	Francis (everbearer)	Louis Gauthier x Pan American	1905	1910
	Superb (everbearer)	Seedling of Autumn x Cooper	1908	1911
	Gold Coin (everbearer)	-	-	1922
1927	USDA Sel. 161	Chesapeake x Dunlap	1921	-
	USDA Sel. 234	Howard 25 x Klondike	1921	-
	USDA Sel. 238	Howard 25 x Klondike	1921	-
	USDA Sel. 244	Chesapeake x Dunlap	1921	-
	USDA Sel. 530	Howard 25 x Klondike	1923	-
	USDA Sel. 552	Howard 25 x Klondike	1923	-
1928	USDA Sel. 38	-	1921	-
	USDA Sel. 778	Missionary x Howard 17	1923	-
	USDA Sel. 802	Merveille de France x Howard 17	1923	-
1929	USDA Sel. 150	Dunlap x Klondike	1921	-
	USDA Sel. 779	Missionary x Howard 17	1923	-
1932	USDA Sel. 902	Kalicene x Howard 17	1925	-
	USDA Sel. 1001	Chesapeake x Kalicene	1926	-
	USDA Sel. 1813	USDA 652 x Bellmar	1929	-
1933	USDA Sel. 167	-	1921	-
	USDA Sel. 1588	Howard 17 x Dorsett	1929	-
	USDA Sel. 1595	Howard 17 x Dorsett	1929	-
	Big Late	-	1909	1917

Besides these the Van Dyke (originated 1919, introduced 1924) and Eaton (introduced 1919) also became variegated sometime before 1927. Berkeley (Rept. Dominion Botanist (Canada) 1927: 128-129. 1928) in 1927 reported variegation on Grand Prize (introduced 1915) on Waits Everbearer (introduced 1922), and on several new seedlings at Vineland Station, Ontario. In 1929 Clark (N. J. Agr. Exp. Sta. Rept. 1929: 228-229) reported

this trouble on Wyona (originated before 1922). In 1932 Hedrick (N. Y. (Geneva) Agr. Exp. Sta. Ann. Rept. 1931/32: 33. 1932) reported variegated plants of Aldrich, of Haverland (originated 1882 Crescent x Sharpless, introduced 1887), and of very many seedlings in the station plots especially with Superb parentage.

Mr. Fulton Allen of Salisbury, Maryland, has told the writer of the New Home (introduced 1905) which became variegated and passed out of cultivation many years ago. W. J. Strong, in a letter to the writer, reported a yellow foliage in 1925 in the Vast (originated 1913, Early Ozark x Michel Early) at Vineland Station, Ontario.

These varieties have become variegated at various periods after being raised as seedlings, after 3 years for the U.S.D.A. 1818, and after 50 years in the case of Haverland. Many varieties enter into their parentage so that they do not represent any one of even a few genetic lines. Though most are northern varieties, the U.S.D.A. selections were originated in Maryland. The Minnesota originated in Minnesota, the Van Dyke in Ontario, Canada, the Alden in New York, and the Eaton in Michigan. Apparently variegation has originated in each of these regions as well as in Maryland.

Different shades or degrees of variegated and yellowed foliage have appeared in selections and varieties. This is best illustrated by the less yellow in leaves of Eaton as compared with the yellow in leaves of Peerless or in the affected plants of Howard 17 and Blakemore. A French variety received under the names Merveille de France and Mirabilis has shown a yellowing in early spring that disappeared in the summer. In Oregon, seedlings with white and green variegated foliage have been seen. The following selections have shown a pale yellowish green color though not typical variegation:

USDA Selections	617	Mixed crosses
	681	Howard 25 x Royal Sovereign
	687	Howard 25 x Espoir
	705	Odette x Americus
	810	Howard 25 x Hericort de Thury

Typical variegated foliage has been observed in the wild both in Fragaria cuneifolia, the inland wild strawberry of Oregon, and in F. chiloensis, the beach strawberry on the coast of Oregon. Affected plants of both species were transplanted to the State Experiment Station at Corvallis, Oregon, and continued to show the same variegation there. Similar variegation was reported in F. vesca, F. moschata, and F. virginiana (See Plant Disease Reporter XVII, p. 147) over 150 years ago.

Usually the affected plants appear very like plants showing (1) a form of alkali injury, (2) manganese deficiency, and (3) injury on some extremely acid soils in North Carolina. Several varieties have been observed with yellow and variegated foliage in many fields in different sections of California, also in Washington, Utah, and Texas where the trouble was clearly due to alkali in the soil. In eastern North Carolina small areas (with a pH 4.7 to 6.4) in many of the berry fields show

yellowish foliage, and in some cases this has been corrected by the use of manganese sulfate. In one extremely acid field (pH about 4) many plants turned yellow and were badly affected by leaf spot. At Kennewick, Washington, the Howard 17 was more susceptible to alkali injury than the Blakemore or any other variety tested there, while in North Carolina the Blakemore has shown more yellow foliage thought to be due to manganese deficiency than has the Missionary. The yellow areas in the leaves of Blakemore in Maryland turn green in November so that by December 1, little yellowing is to be seen. This suggests some relation of variegation to light intensity or quality.

In the breeding work of the U. S. Department of Agriculture near Washington, seedlings and selections with variegated and yellowed foliage appear almost every year. Seedlings may show yellow cotyledons as soon as they appear above ground, or the yellowing or variegation may not show until the seedlings have one, two, or several leaves or until the plant has been set in the field. The variegation may not show until the seedling has been selected as a promising new variety, has been propagated, and has been sent out for trial.

The evidence from the breeding work suggests very definitely a genetic inheritance resulting in lack of chlorophyll and final death of the plant. Likewise the appearance of yellow-leaved plants a few weeks or months later suggests that such appearance a few or many years later may also be due to some genetic defect. The appearance of some strains of Howard 17 (Premier), Blakemore, Minnesota, Haverland, and other varieties with yellowed leaves seems to the writer to suggest a mutation, perhaps due to some stimulus. Such an explanation may be as acceptable as to assume a virus or both a virus and a genetic mutation.

EARLY RECORDS OF CRANBERRY FALSE BLOSSOM

The recent discovery of cranberry false blossom in Nova Scotia and the continued spread of the disease in this country make additional information on the early history of the disease of present interest.

Several significant early records which have recently come to light in the correspondence of Dr. C. L. Shear are reproduced herewith. This disease was apparently first called to Dr. Shear's attention in a letter from O. G. Malde, then in charge of cranberry investigations for the University of Wisconsin, and stationed near Wisconsin Rapids (then called Grand Rapids, Wisconsin). This letter is dated July 6, 1907.

> On the 3rd inst. I expressed you a package of vines (cranberry) affected with what we term "False Blossom," where the blossom opens up like a sun flower, the petals not taking up the natural pink or curling back, but sometimes the middle of the blossom will fill up with a sort of green pod above the level of the petals, the sepals being short and green.
>
> The buds from which these "False Blossoms" come are in nearly all cases abnormally large in the fall (October), and somewhat premature.

> It had been thought that it was a condition that became noticeable on old vines and on a certain kind of variety of native berry (the Berlin Bell) but I have now found it quite prevalent on three year old vines of the Jumbo (only in the Mather district).
>
> The disease, if it may be called that, is present only in one particular district (the Mather-Warrens district, Jackson County, Wisconsin) and is taking on very serious proportions on some bogs.

Another letter from Malde to Shear names specifically two bogs on which false blossom was then sufficiently abundant to attract attention. This letter is dated June 16, 1908.

> On the 12th inst. I mailed you a package of cranberry vines just picked from the Hoffman bog at Mather, and which had the so called "false blossoms." I will designate that package as #1, and now under separate cover I am sending you via express U.S. an assortment of the "false blossom" and of the "Sclerotinia" which I have numbered so they may be referred to by same.
>
> Number 2 from uprights from 4 to 5 years old "Jumbo" vines on Richard Rezin's bog at Mather, the blossoms on same though nearly natural show a tendency to the "false blossoms" and chiefly in that the peduncle does not turn so as to suspend the blossoms.

These two letters offer concrete documentary evidence in support of the idea generally held in Wisconsin that what first called the attention of investigators to this disease was its severity on the bog of Richard Rezin in the Mather-Warrens district. On this bog was planted a large block of Bennett [Jumbo] cranberries from which due to the inroads of false blossom no crop was ever obtained.

In 1914, Dr. Shear and Dr. H. J. Franklin found the disease on Cape Cod, Massachusetts. It was at that time very scarce as is indicated by the following quotation from a letter from Shear to Malde dated June 18, 1915.

> In this connection I may say that last summer I found the Wisconsin false blossom in one bog on Cape Cod but the vines had come originally from Wisconsin. This is the only case in which I have ever seen or heard of the Wisconsin false blossom in the East.

The following letter from Malde to Shear dated June 12, 1915, contains the first report of the spread of false blossom on the experimental plots of the cranberry station near Wisconsin Rapids.

I have a new puzzle in the four year old "Centennials" and "Mammoth" purchased from A. D. Makepeace in 1911. They are showing up traces of "False Blossom" and I wish to call your attention to this in case you should have a chance to visit the Cape soon to investigate this to determine if the trouble has all developed here.

A subsequent letter from Malde records the presence of false blossom in the Cranmoor (Wisconsin Rapids) area whereas in the 1907 report it is specifically referred to as only in the Mather-Warrens area.

Observation on the "false blossom" during the past season showed some increase of this malady on some of the area in the Cranmoor district, especially at the experimental station on our native vines, and to some extent there was a slight decrease in its appearance on some of the bogs in the Mather district, while some of the bogs showed an increase of the malady.

The following letter from Mr. F. S. Chambers dated July 14, 1915, together with the sketch map prepared by Mr. Chambers which accompanied the letter gives an exact record of the first discovery of false blossom in New Jersey though this may not have been the first introduction of the disease.

The observations made in 1915 indicate that at that time the Bennett [Jumbo] vines from Wisconsin were diseased while those of another variety from Judge Gaynor were not, which is further evidence that the Bennett, even at that early date, was generally infected.

Our search for the Wisconsin false blossom was caused by the reference to this trouble in Dr. Franklin's Bulletin #160.

We are having the vines mowed in the neighborhood of the infected ones and will burn them as soon as they are dry enough, after which we shall probably kill the roots with sulphuric acid.

We enclose a rough sketch of the affected bogs. Two barrels of vines were sent to us by Judge Gaynor of Wisconsin. One barrel of Jumbo variety was planted at the lower end of the Smith Bog, the balance of the bog being planted at the same time with Centennial vines cut from our own bogs.

The other barrel of Wisconsin vines, the variety of which we do not know, was planted on the lower side of the Big Swamp bog in a mud bottom. The balance of this bog was also planted with our own Centennial vines. No false blossoms have been found on the Wisconsin vines planted in the Big Swamp bog and it seems probable that the disease has spread from the Jumbo vines in the Smith bog.

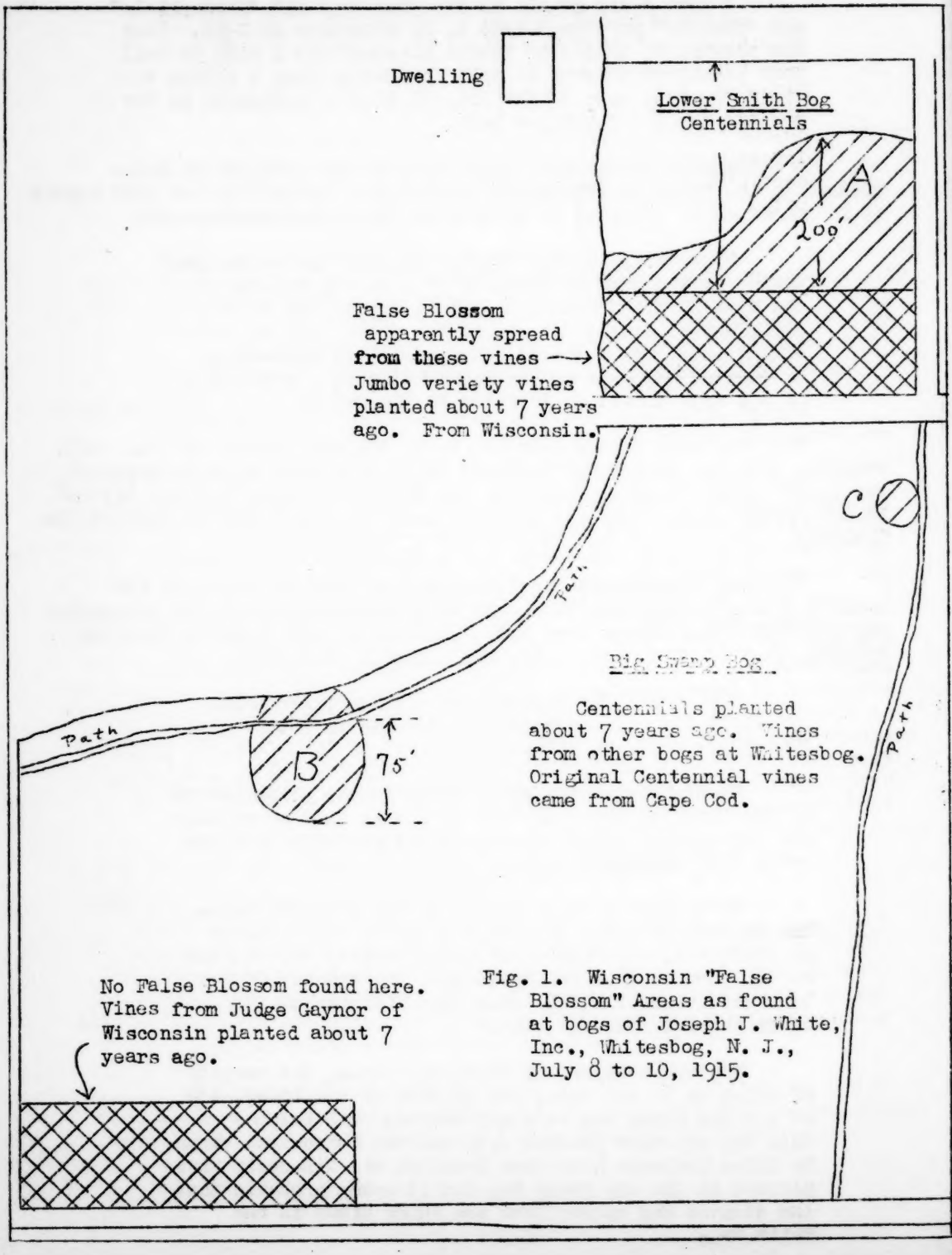

Fig. 1. Wisconsin "False Blossom" Areas as found at bogs of Joseph J. White, Inc., Whitesbog, N. J., July 8 to 10, 1915.

Areas marked A, B, and C contain occasional plants showing false blossoms. The number of false blossoms, however, is probably less than 1 per cent of the total blossoms in each of the areas. In the Smith bog the disease has scattered for a distance of about 200 feet beyond the Wisconsin vines. If the disease is an infectious one its spreading on this bog could easily be accounted for by chickens which made a net work of small paths over this bog.

It will be noted that both areas B and C in the Big Swamp bog are along paths which lead from the lower end of the Smith bog and which have been in frequent use for several years.

EARLY REPORTS ON APPLE SCAB (VENTURIA INAEQUALIS)

Reports from New York and Illinois show that apple scab perithecia are late in maturing this year.

NEW YORK: Apple scab perithecia are much retarded in development in comparison with the past two years. Only a very small percentage of perithecia contained well developed asci in McIntosh leaf samples gathered at Ithaca today, March 26, and no evidence was found of ascospore formation. (W. D. Mills, Mar. 28).

ILLINOIS: Owing to a very dry winter, the apple scab perithecia are hard to find, in spite of the fact that the worst apple scab epidemic ever known occurred in this State last year. In February, 1933, I was able to find scab perithecia on practically every leaf in an orchard here at the University. I found none in February of this year and only three leaves in a hundred examined in March showed perithecia. (We have had five snows in March.) The first mature ascospores were found in the Urbana material on March 15. Last year I found mature ascospores on February 22. (H. W. Anderson, Mar. 26).

DOWNY MILDEW OF TOBACCO IN 1934

A telegram from W. M. Lunn, dated April 5, reports downy mildew (Peronospora sp.) from Williamsburg County, near Hemingway, South Carolina. The disease had previously been reported from Georgia. Tobacco plants are said to be small and backward this year. The smaller the plants the more easily they are killed by the fungus. Growers are much alarmed at the prospects of damage. (E. E. Clayton).